

Table of contents

Instructions: W0010041

Product: K1 alternator
Part no.: 0 120 4..

| | |
|--|--------|
| Special features | I02/1 |
| Structure, usage | I07/1 |
| General information | I08/1 |
| Safety measures | I09/1 |
| Testers, equipment, tools | I12/1 |
| Lubricants | I15/1 |
| Test values and settings | I16/1 |
| Tightening torques | I19/1 |
| Circuit diagram | I21/1 |
| Alternator Disassembly/-Test -Table | I27/1 |
| Component cleaning | II23/1 |
| Alternator assembly table | II24/1 |

Continue: I01/2

TABLE OF CONTENTS

| | |
|----------------|---------|
| Editorial note | III13/1 |
|----------------|---------|

Continue: I01/1

SPECIAL FEATURES

These instructions contain repair operations and the corresponding test specifications for the alternators

0 120 4.. ... and 6 033 G.. ...
K1 (RL) 14 V.

Continue: I02/2

SPECIAL FEATURES

N o t e :

These repair instructions were compiled on the basis of alternators 0 120 489 346 and 0 120 488 205.

The various alternator versions can be seen from the appropriate parts lists.

Continue: I03/1

SPECIAL FEATURES

Certain versions feature a modified bearing seat on the collector-ring end to increase the vibration resistance of the alternators.

There are two types:

1. Collector-ring end shield with O-ring
2. Collector-ring end shield with plastic bushing

N O T E :

Subsequent conversion of collector-ring end shield to type 1 or type 2 is not possible on account of end-shield dimensions.

Continue: I03/2

SPECIAL FEATURES

The alternator housing is made of gray cast iron or die-cast aluminum. Particular care must be taken when dismantling and assembling die-cast aluminum version as the housing can easily become damaged.

Deformation and surface damage may permanently impair the fit accuracy of the alternator components, which in turn may result in alternator damage during operation.

Continue: I04/1

SPECIAL FEATURES

Since the end of 1976, various alternators with sheet-steel fan and pulley have been fitted in the course of further development with a supporting plate 1 120 140 009 between fan and belt-pulley assembly.

The 5 mm wide and 0.3 mm high embossment at the edge of the supporting plate presses against the fan. Depending on alternator design, a slotted washer or the belt pulley is mounted directly on the end facing the belt pulley. The slotted washer/belt pulley presses with the 26 mm dia. collar against the supporting plate.

Continue: I04/2

SPECIAL FEATURES

Sheet-steel belt pulleys feature a second slotted washer. Spring lock washer or spring washer and securing nut remain unchanged. The tightening torque of the overall assembly is still 35...45 Nm. The clamping fixture 0 986 618 107 is required for holding the belt pulley when tightening the nut. Alternators with collar nut have a higher torque of 65...75 Nm.

Continue: I05/1

SPECIAL FEATURES

N o t e :

Never use a screwdriver or the like to block the fan and pulley. Bent or damaged fan blades will result in alternator damage.

The entire assembly is geared to the alignment of the V-belt. Alterations or assembly errors may cause damage.

Continue: I05/2

SPECIAL FEATURES

Alternator e.g.: K1 () 14 V 28/70A

N: = > Outer diameter

| | | | | |
|-----|-------|-----|-----|----|
| G = | 100 | ... | 109 | mm |
| K = | 120 | ... | 129 | mm |
| N = | 130 | ... | 139 | mm |
| T = | 170 | ... | 199 | mm |
| U = | Above | | 200 | mm |

l: = > Type

- 1 Claw pole
- 2 Salient pole
- 3 Windingless rotor

Continue: I06/1

SPECIAL FEATURES

K1 () 14 V 28/70A

() : = > Direction of rotation

(->) Or R = Clockwise

(<-) Or L = Counter-
clockwise

(<->) Or RL = Clockwise
and counter-
clockwise

14V: = > Alternator voltage in V

28A: = > Current at 1500 min⁻¹

70A: = > Rated current in A
measured at n = 6000 min⁻¹

Continue: I01/1

STRUCTURE, USAGE

PC user prompting:

Position cursor on button and confirm.

Microcard user prompting:

User prompting is provided on every page e.g.:

- Continue: I 17/1

- Continue: II 18/1 Fig.: II 17/2

Brief instructions may include several rows of coordinates.

I../. = first coordinate row

II../. = second coordinate row

III../. = third coordinate row

etc.

.../1 = upper coordinate half

.../2 = lower coordinate half

Continue: I01/1

GENERAL

Expert repairs are only possible using the prescribed tools and measuring instruments, which are in perfect working order. We therefore recommend that exclusive use be made of the tools listed.

The use of incorrect and unsuitable tools and testers can lead to injury and may damage the product concerned or its component parts.

Continue: I08/2

GENERAL

Only use replacement parts given in the service parts list for the type of alternator concerned.

Proper functioning presupposes use of the lubricants specified in these instructions, both prior to and during assembly.

Absolute cleanliness is to be ensured when performing repair work.

Continue: I01/1

SAFETY MEASURES

A T T E N T I O N : F I R E R I S K

For interference suppression, alternators are fitted with capacitors with a long storage time.

When washing out components, capacitor discharge may occur on immersing components in cleaning fluids, thus possibly causing inflammable liquids to catch fire.

Continue: I09/2

SAFETY MEASURES

For this reason, components with capacitors are only to be washed out in HAKU 1025/6.

Continue: I10/1

SAFETY MEASURES

Always heed the following safety regulations:

- * German Order governing the use of flammable liquids (VbF).
 - * Accident prevention regulations for electrical systems and equipment.
 - * Safety regulations for the handling of chlorinated hydrocarbons:
 - For companies: ZH 1/222
 - For employees: ZH 1/129
- issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

Continue: I10/2

SAFETY MEASURES

Outside Germany, pay attention to appropriate local regulations.

Skin protection:

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

Continue: I11/1

SAFETY MEASURES

Component cleaning:

Only use compressed air (max. 4 bar) and a clean cloth for cleaning armature, excitation winding and alternator plate.

Never use liquid cleaning agents.

Other parts, such as intermediate bearing and drive-end bearing can be washed out in a standard cleaner which is not readily flammable.

Take care never to inhale vapors.

Continue: I11/2

SAFETY MEASURES

Avoid fire, naked flames and sparks.

A T T E N T I O N:

Thoroughly dry cleaned parts, as gases form and may cause an explosion.

Only use the stated tools.
Injuries cannot be precluded if use is made of incorrect and unsuitable tools and testers.

Continue: I01/1

TESTERS, FIXTURES, TOOLS

Testers:

| | |
|--|---|
| Tool board: | 0 986 618 010 (KDLJ T 100) |
| Interturn short-circuit tester: | 0 986 619 110 (KDAW 9978) |
| Test prods: | 0 986 619 101 |
| or | |
| Old version: | 0 986 619 114 |

Continue: I12/2

TESTERS, FIXTURES, TOOLS

Testers:

| | |
|--|----------------------|
| Universal measuring instrument MMD 302: | 0 684 500 302 |
| or | |
| Electrical-system tester ETE 014.00: | 0 684 101 400 |
| Dial indicator: | 1 687 233 011 |
| Magnetic measurement stand: | 4 851 601 124 |
| Alternator tester WPG 012.00: | 0 684 201 200 |

Continue: I13/1

TESTERS, FIXTURES, TOOLS

Tools:

3 feeler gauges: 0 986 618 378
0.15 ... 0.6 mm (KDZV 7399)

Mandrel press: comm. avail.

Clamping support: 0 986 619 362
(KDAW 9999)

Two V-blocks: comm. avail.

Clamping fixture for
belt pulley: 0 986 618 107
(KDLJ 6006)

Continue: I13/2

TESTERS, FIXTURES, TOOLS

Tools:

Clamping pin for
mandrel press: 0 986 618 124
(KDLJ 6010)

Socket wrench for
belt pulley: 0 986 618152
(KDLJ 6030)

Allen key: comm. avail.

Continue: I14/1

TESTERS, FIXTURES, TOOLS

Pressing-in mandrel: 0 986 618 178
(KDLJ 6499/0/3)

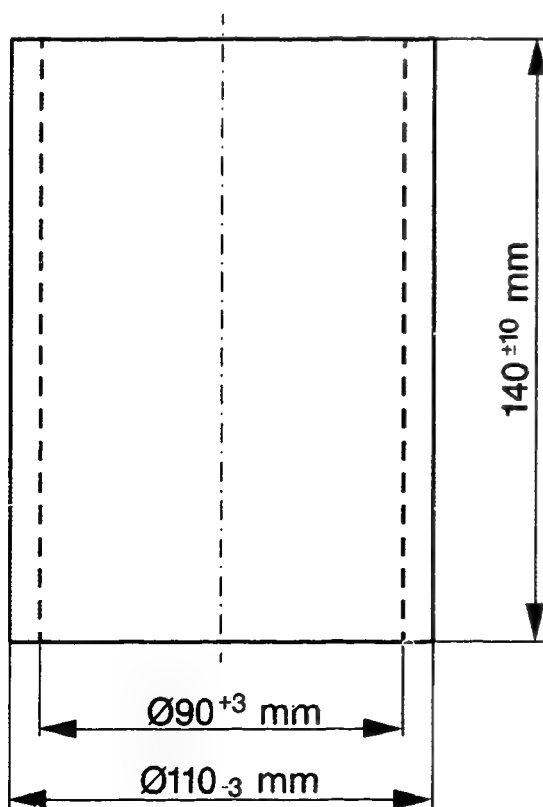
Pressing-on mandrel
for collector rings: 0 986 618 101
(KDLJ 6004/1)
(KDLJ 6004/0/1)

Soldering iron 180 W: comm. avail.

Pressing-out ring
for rotor: to be improvised

Continue: I01/1 Fig.: I14/2

KME00422



LUBRICANTS AND ADHESIVES

General:

Commutator and carbon brushes are to be kept free from grease and oil.

Greased parts are to be degreased before re-lubricating them.

On old versions with open ball bearing, grease Ft1v34 must be applied to the ball-bearing seat in the plastic race prior to assembly.

Continue: I15/2

LUBRICANTS AND ADHESIVES

Dispersion adhesive

KK57v1: 5 703 151 000

Silicone (Elastosil 07): comm. avail.

Ft1v34: 5 700 009 000

Continue: I01/1

TEST SPECIFICATIONS AND SETTINGS

| | |
|--------------------|----------------|
| Stator resistance: | 0.1 ohms +10% |
| Versions: | |
| K1 14V 28/22A: | 0.26 ohms +10% |
| K1 14V 35/20A: | 0.26 ohms +10% |
| K1 14V 35/21A: | 0.26 ohms +10% |
| K1 14V 35/22A: | 0.20 ohms +10% |
| K1 14V 43/21A: | 0.18 ohms +10% |
| K1 14V 45/20A: | 0.18 ohms +10% |
| K1 14V 45/22A: | 0.17 ohms +10% |
| K1 14V 45/24A: | 0.15 ohms +10% |
| K1 14V 50/21A: | 0.11 ohms +10% |
| K1 14V 50/22A: | 0.13 ohms +10% |
| K1 14V 55/20A: | 0.14 ohms +10% |
| K1 14V 65/24A: | < 0.11 ohms |
| K1 14V 70/20A: | < 0.11 ohms |

Continue: I16/2

TEST SPECIFICATIONS AND SETTINGS

| | |
|-------------------|------------------|
| Rotor resistance: | 4.0 ohms +10% 1) |
| Versions: | |
| K1 14V 32/22A: | 7.0 ohms +10% |
| K1 14V 35/21A: | 5.2 ohms +10% |
| K1 14V 50/21A: | 4.4 ohms +10% |
| K1 14V 65/21A: | 2.8 ohms +10% |
| K1 14V 65/24A: | 3.4 ohms +10% |
| K1 14V 70/20A: | 2.8 ohms +10% |

1) Figure for alternators with transistor regulator is 3.4 or 2.9 ohms.

Continue: I17/1

TEST SPECIFICATIONS AND SETTINGS

Interfer.-suppr.

capacitor: 1,8...2,6 microfarad

Eccentricity:

OD of rotor: 0,05 mm

OD of collector rings: 0,03 mm

Diameter of collector rings

Table:

| Alternator | Collector ring diameter | |
|---------------|-------------------------|---------|
| | New | min. |
| 0 120 400 ... | 32.5 mm | 31.5 mm |
| 0 120 400 836 | 27.8 mm | 26.8 mm |
| 0 120 489 ... | 32.5 mm | 31.5 mm |
| 0 120 489 ... | 27.8 mm | 26.8 mm |

Continue: I17/2

TEST SPECIFICATIONS AND SETTINGS

Brush projection table:

EE regulator 0 192 052 ...

(collector ring diameter in parentheses)

| Alternator | New | min. |
|----------------------|-------|--------|
| 0 120 489 ... (27.8) | 14 mm | 5.0 mm |
| 0 120 489 ... (32.5) | 10 mm | 5.0 mm |

EL regulator 0 192 311 0..

| Alternator | New | min. |
|----------------------|------------|--------|
| 0 120 489 ... (32.5) | 11...12 mm | 5.0 mm |
| 0 120 489 ... (27.8) | 12...13 mm | 5.0 mm |

Continue: I18/1

TEST SPECIFICATIONS AND SETTINGS

Brush projection table:
EM regulator 0 192 311 1..
(collector ring diameter in
parentheses)

| Alternator | New | min. |
|----------------------|-----------|--------|
| 0 120 489 ... (27.8) | 12..13 mm | 5.0 mm |

| Externally mounted regulator 0 192 .. | Alternator | New | min. |
|---------------------------------------|----------------------|-------|--------|
| | 0 120 400 ... (27.8) | 14 mm | 5.0 mm |
| | 0 120 400 ... (32.5) | 10 mm | 5.0 mm |
| | 0 120 400 836 (27.8) | 10 mm | 5.0 mm |

Continue: I01/1

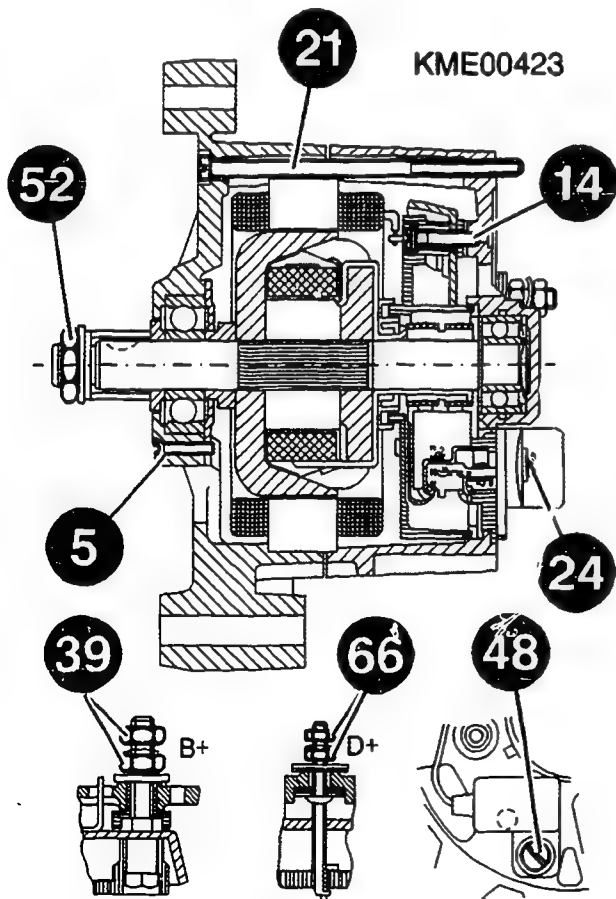
TIGHTENING TORQUES

| | | | |
|---------|---|-----------|------|
| Item 5 | = | 2.4...3.5 | Nm |
| Item 14 | = | 1.4...2.0 | Nm |
| Item 21 | = | 4.1...5.5 | Nm |
| Item 24 | = | 1.6...2.3 | Nm |
| Item 39 | = | 3.6...4.8 | Nm* |
| Item 48 | = | 2.9...4.1 | Nm |
| Item 52 | = | 35 ... 45 | Nm** |
| Item 66 | = | 1.6...2.3 | Nm |

* Alternators with 8 mm bolt have a higher torque of 4.8...6.8 Nm.

** Alternators with collar nut have a higher torque of 65...75 Nm.

Continue: I20/1 Fig.: I19/2



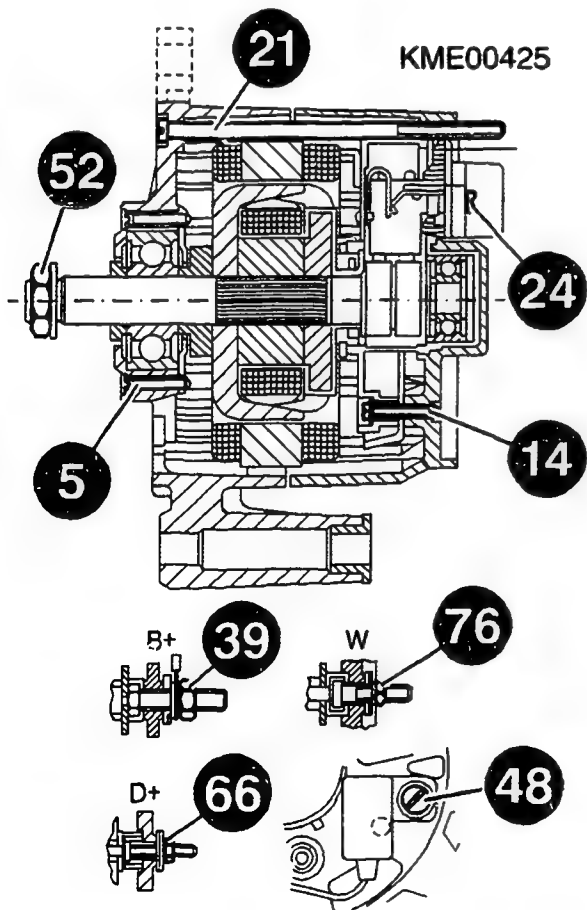
TIGHTENING TORQUES

| | | | | |
|------|----|---|-----------|------|
| Item | 5 | = | 2.4...3.5 | Nm |
| Item | 14 | = | 1.4...2.0 | Nm |
| Item | 21 | = | 4.1...5.5 | Nm |
| Item | 24 | = | 1.6...2.3 | Nm |
| Item | 39 | = | 3.6...4.8 | Nm* |
| Item | 48 | = | 2.9...4.1 | Nm |
| Item | 52 | = | 45 ... 55 | Nm** |
| Item | 66 | = | 1.6...2.3 | Nm |
| Item | 76 | = | 2.6...3.8 | Nm |

* Alternators with 8 mm bolt have a higher torque of 4.8...6.8 Nm.

** Alternators with collar nut have a higher torque of 65...75 Nm

Continue: I01/1 Fig.: I20/2



CIRCUIT DIAGRAM

(Both poles insulated)
1 = Alternator
2 = Regulator

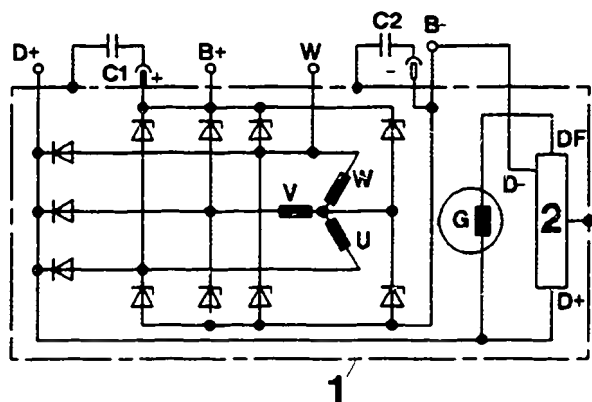
Versions:

Same circuitry on version without Zener diodes or additional diodes at neutral point.

Continue: I22/1

Fig.: I21/2

KME00387



CIRCUIT DIAGRAM

(Both poles insulated)

1 = Alternator

2 = Regulator

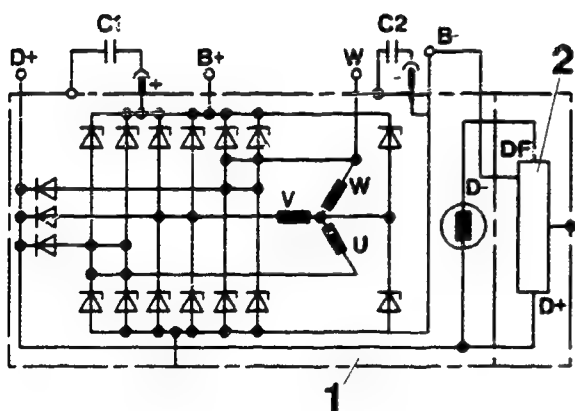
Versions:

Same circuitry on version without Zener diodes or additional diodes at neutral point.

Continue: I23/1

Fig.: I22/2

KME00388



CIRCUIT DIAGRAM

(One pole insulated)

1 = Alternator

2 = Regulator

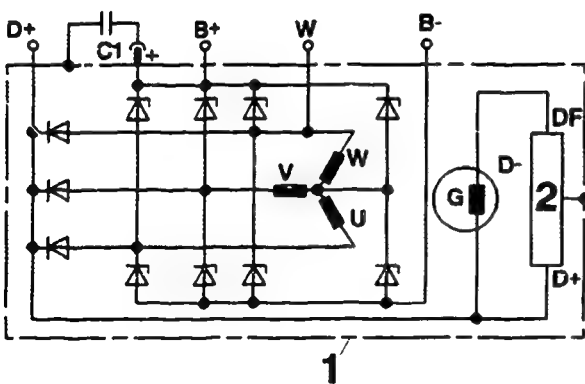
Versions:

Same circuitry on version without Zener diodes or additional diodes at neutral point.

Continue: I24/1

Fig.: I23/2

KME00390



CIRCUIT DIAGRAM

(One pole insulated)

1 = Alternator

2 = Regulator

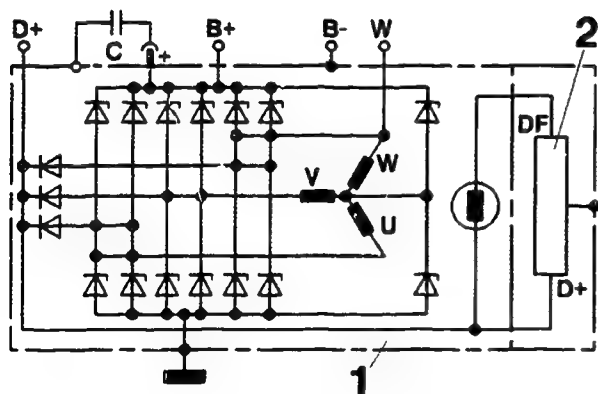
Versions:

Same circuitry on version without Zener diodes or additional diodes at neutral point.

Continue: I25/1

Fig.: I24/2

KME00095



CIRCUIT DIAGRAM

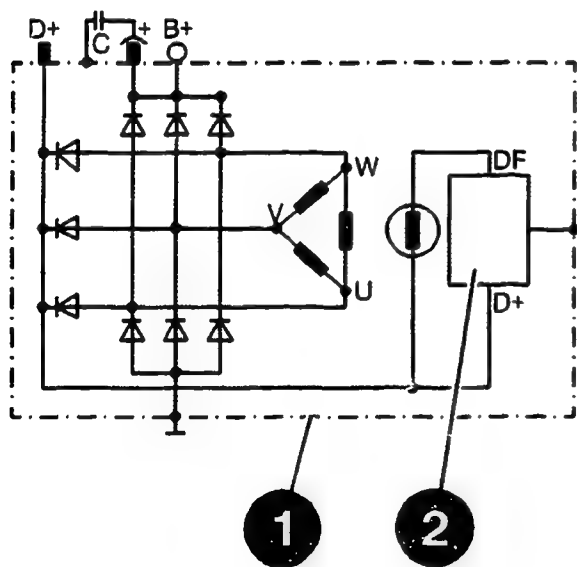
1 = Alternator

2 = Add-on regulator

Circuit diagram of K1 alternator in delta configuration, 0 120 489 ..., 70 A with add-on regulator.

Continue: I26/1 Fig.: I25/2

KME00427



CIRCUIT DIAGRAM

1 = Alternator

2 = Add-on regulator

L = Connection for fault indicator lamp

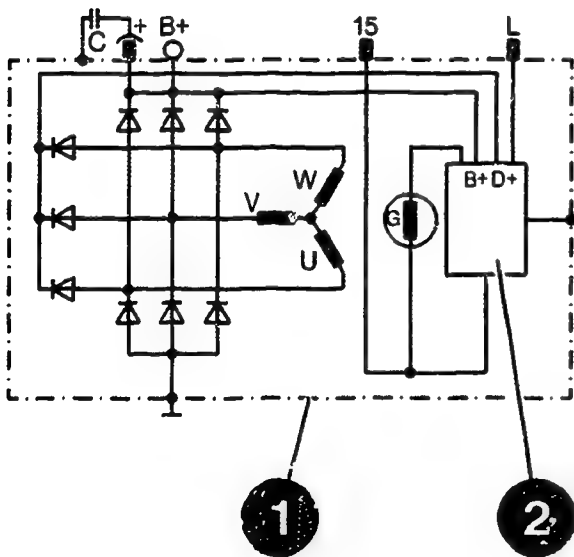
Circuit diagram of K1 alternator in

delta configuration, 0 120 4.. . . .,

with EM add-on regulator 1 197 311 1..

Continue: I01/1 Fig.: I26/2

KME00426



ALTERNATOR DISASSEMBLY/TEST TABLE

| | |
|---|--------|
| Clamping alternator | I28/1 |
| Removing regulator | II01/1 |
| Checking regulator and carbon brushes | II02/1 |
| Checking interference-suppression capacitor | II03/1 |
| Removing fan and pulley | II04/2 |
| Dismantling drive-end bearing | II08/1 |
| Checking rectifier | II10/1 |
| Checking stator (resistance) | II12/1 |

Continue: I27/2

ALTERNATOR DISASSEMBLY/TEST TABLE

| | |
|--------------------------------|--------|
| Removing stator | II13/1 |
| Checking stator (ground short) | II14/1 |
| Removing rectifier | II15/1 |
| Dismantling claw-pole rotor | II15/1 |
| Checking rotor | II18/1 |
| Measuring concentricity | II20/1 |
| Pulling off collector rings | II22/1 |

Continue: I01/1

DISMANTLING AND CHECKING ALTERNATOR

Clamping alternator:

Clamp alternator in clamping support.

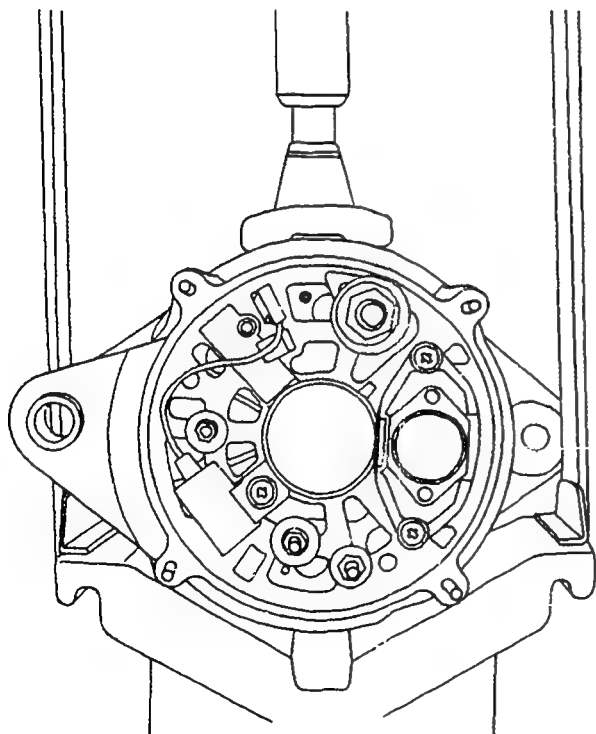
Clamping support:

0 986 619 362

Continue: I27/1

Fig.: I28/2

KME00489



DISMANTLING AND CHECKING ALTERNATOR

Removing regulator:

N O T E:

Detach electronic regulator prior to further disassembly of alternator. This involves unfastening and removing regulator bolts.

Failure to adhere to this sequence will cause the carbon brushes to break when pulling the alternator apart.

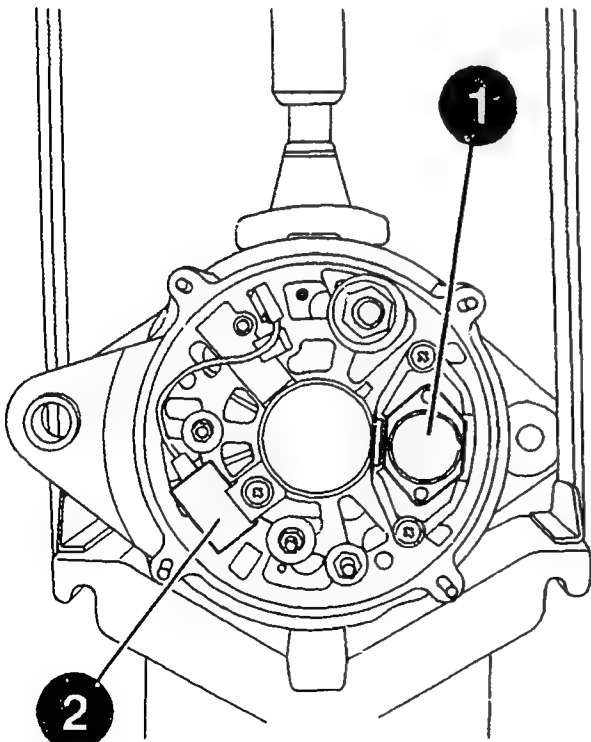
1 = Electronic regulator

2 = Capacitor

Continue: I27/1

Fig.: II01/2

KME00406



DISMANTLING AND CHECKING ALTERNATOR

Checking regulator and carbon brushes:

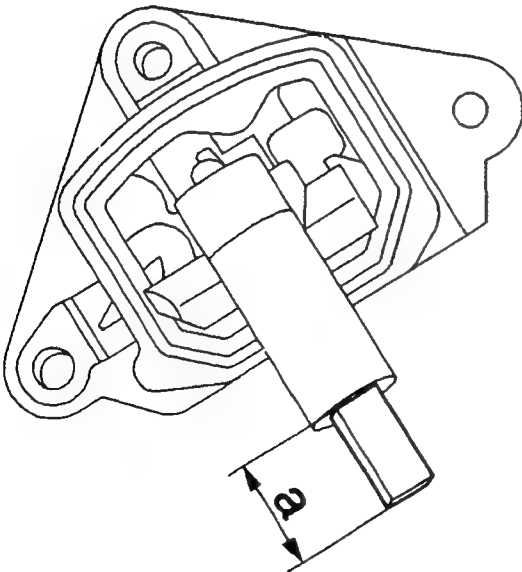
Check regulator for external damage.

Replace regulator if carbon brushes have broken off or if projection "a" is less than 7 mm.

Min. brush projection: 5 mm

Continue: I27/1 Fig.: I102/2

KME00355



DISMANTLING AND CHECKING ALTERNATOR

Checking interference-suppression capacitor:

Detach wire of interference-suppression capacitor from B+ plug connection.

Connect up universal measuring instrument MMD 302 between wire of interference suppression capacitor and terminal B- (if provided) of alternator.

Set value: 1,8...2,6 microfarad

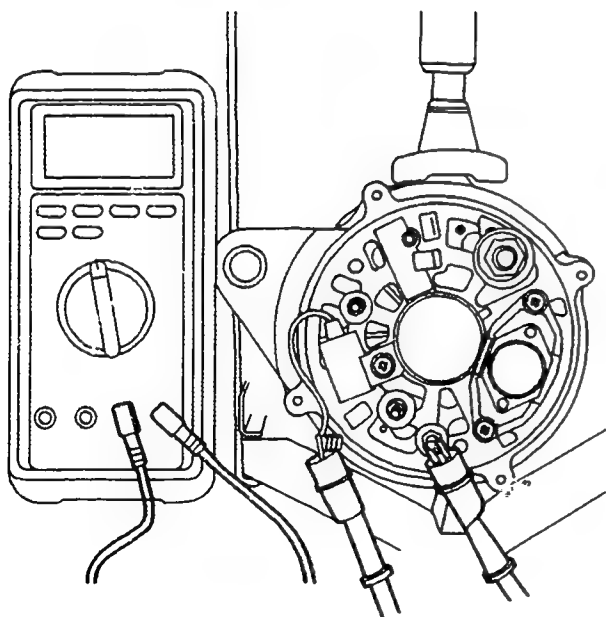
Renew defective interference-suppression capacitor if set value is not attained.

Universal measuring instrument MMD 302:

0 684 500 302

Continue: II04/1 Fig.: II03/2

KME00395



DISMANTLING AND CHECKING ALTERNATOR

Checking interference-suppression capacitor:

A T T E N T I O N:

After checking, short-circuit interference-suppression capacitor and thus discharge it to ensure that cleaning fluid does not catch fire when cleaning components.

Continue: I27/1

DISMANTLING AND CHECKING ALTERNATOR

Removing fan and pulley:

N O T E:

Always use suitable tools for removing and installing fan and belt pulley, as bent or damaged fans and pulleys may jeopardize proper functioning of the alternator.

Continue: I105/1

DISMANTLING AND CHECKING ALTERNATOR

Removing fan and pulley:

If alternators are fitted at the factory with a supporting plate, this must remain in place when performing repairs, as the entire alternator assembly is geared to the alignment of the V-belt and alterations/assembly errors could result in damage.

Continue: II06/1

DISMANTLING AND CHECKING ALTERNATOR

Removing fan and pulley:

On older alternators, use clamping fixture and suitable box wrench to unfasten securing nut and remove belt pulley with fan.

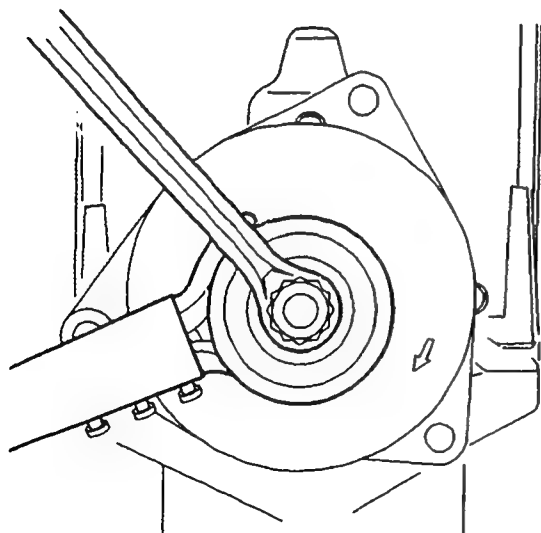
Clamping fixture:

0 986 618 107

Continue: II07/1

Fig.: II06/2

KME00396



DISMANTLING AND CHECKING ALTERNATOR

Removing fan and pulley:

On new alternators, attach socket wrench to securing nut of belt pulley.

Support rotor shaft of alternator with suitable Allen key and use appropriate box wrench to unfasten nut.

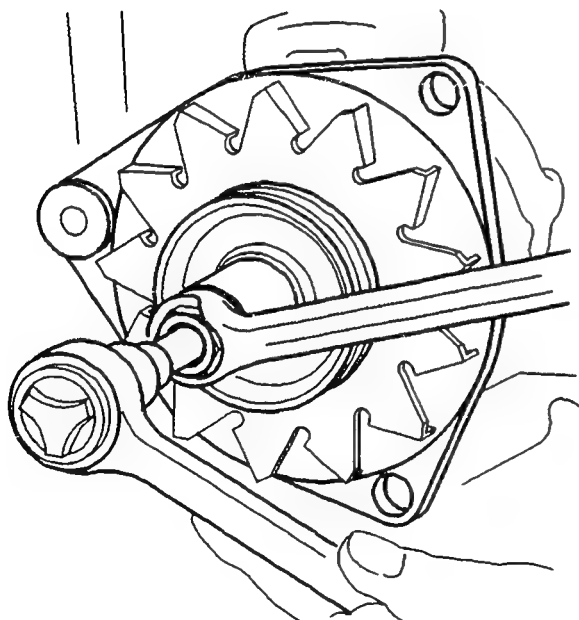
Socket wrench:

0 986 618 160

Continue: I27/1

Fig.: II07/2

KME00142



DIISMANTLING AND CHECKING ALTERNATOR

Dismantling drive-end bearing:

N O T E:

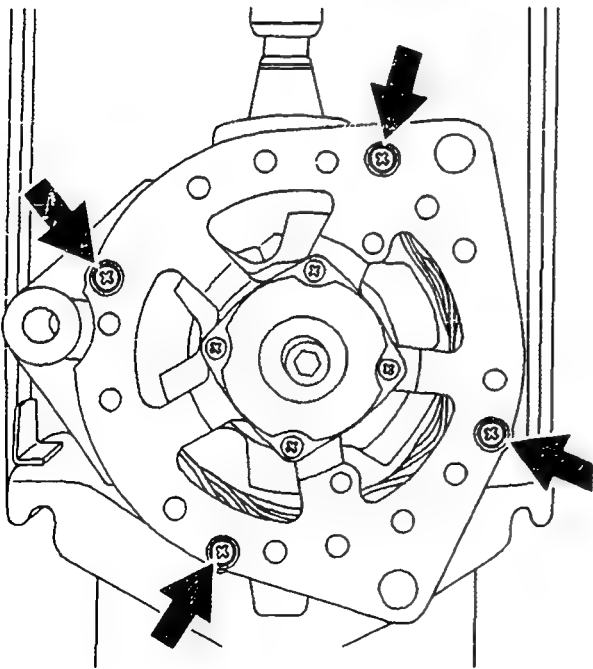
Prior to further alternator dis-assembly, mark drive-end bearing, collector-ring end shield and stator to ensure that these components are fitted in the same position on assembly.

Unfasten and remove bolts. Pull drive-end bearing with rotor out of collector-ring end shield.

Continue: II09/1

Fig.: II08/2

KME00398



DISMANTLING AND CHECKING ALTERNATOR

Dismantling drive-end bearing:

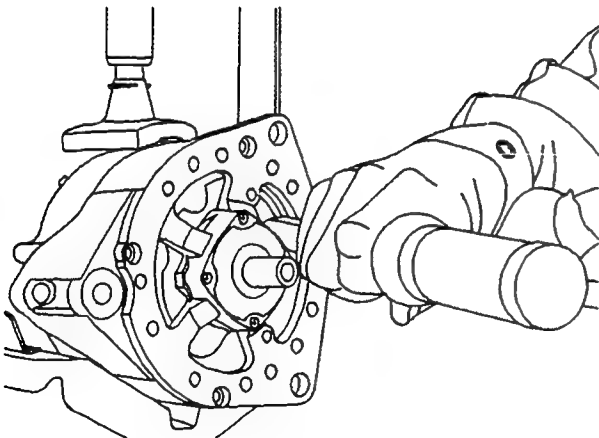
N O T E:

If stator in drive-end bearing has become seized up, it must be released before pulling out rotor. This is done by applying a suitable soft punch to the stator and detaching it from the drive-end bearing by tapping gently.

Continue: I27/1

Fig.: II09/2

KME00399



DISMANTLING AND CHECKING ALTERNATOR

Checking rectifier:

Use alternator tester to check function of wired-up rectifier.

Capacitor not connected.

Note switch positions on alternator tester.

Measurement points:

Housing and ends of windings

B+ and soldered joint, stator connections

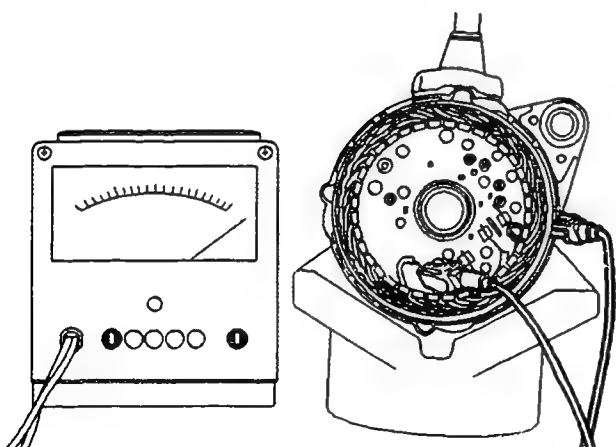
D+ and soldered joint, stator connections

Alternator tester: 0 684 201 200

Continue: II11/1

Fig.: II10/2

KME00400



DISMANTLING AND CHECKING ALTERNATOR

Checking rectifier:

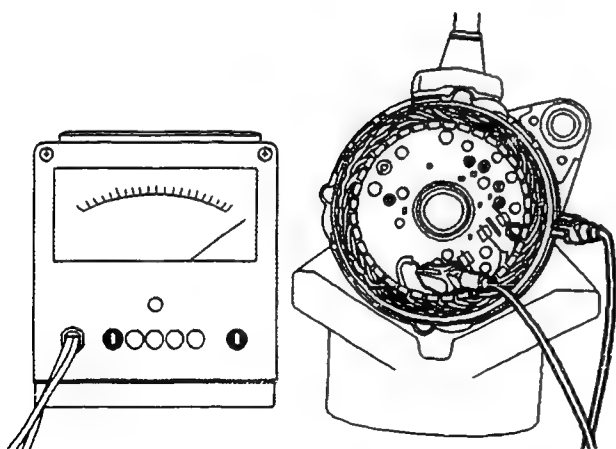
Rectifier is OK if pointer of alternator tester is in green range.

Renew entire rectifier if one or more diode(s) is/are defective.

Continue: I27/1

Fig.: I111/2

KME00400



DISMANTLING AND CHECKING ALTERNATOR

Checking stator (resistance):

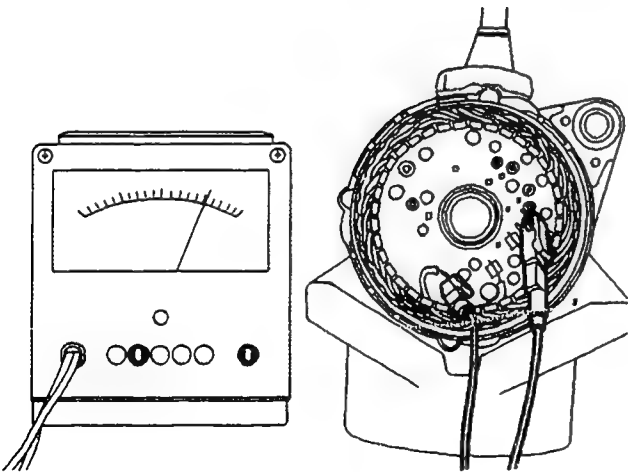
Check stator resistance with stator installed. Pay attention to switch setting on tester. Stator resistances can be seen from TEST SPECIFICATIONS AND SETTINGS section.

Repeat test after removing stator (not illustrated).

Alternator tester: 0 684 201 200

Continue: I27/1 Fig.: I112/2

KME00401



DISMANTLING AND CHECKING ALTERNATOR

Removing stator:

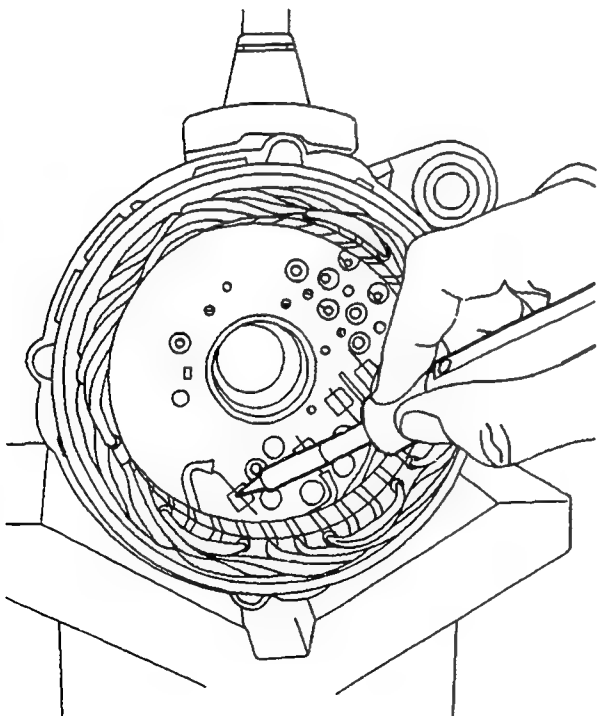
Use soldering iron or gun to remove tin solder from phase connections.

Bend open wiring connections with screwdriver and pull wiring out of eyelets.

Continue: I27/2

Fig.: II13/2

KME00402



DISMANTLING AND CHECKING ALTERNATOR

Checking stator (ground short):

Test voltage: 80 V AC

A T T E N T I O N:

Voltages of 80 V can cause fatal injury.

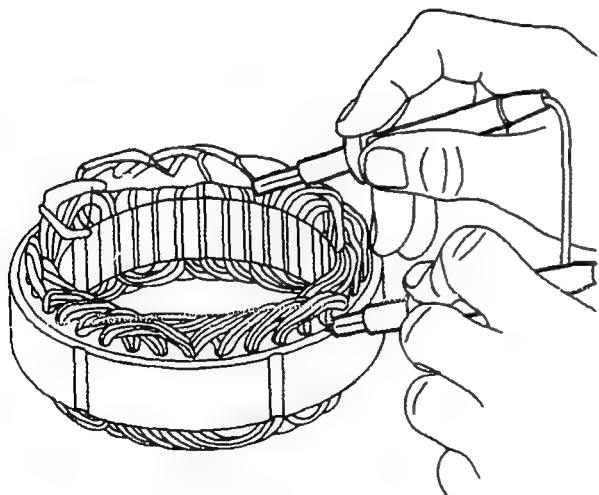
When performing this test always take care to handle stator and all parts coming into electrical contact with it in the proper manner.

Test prods: 0 986 619 101

Continue: I27/2

Fig.: II14/2

KME00403



DISMANTLING AND CHECKING ALTERNATOR

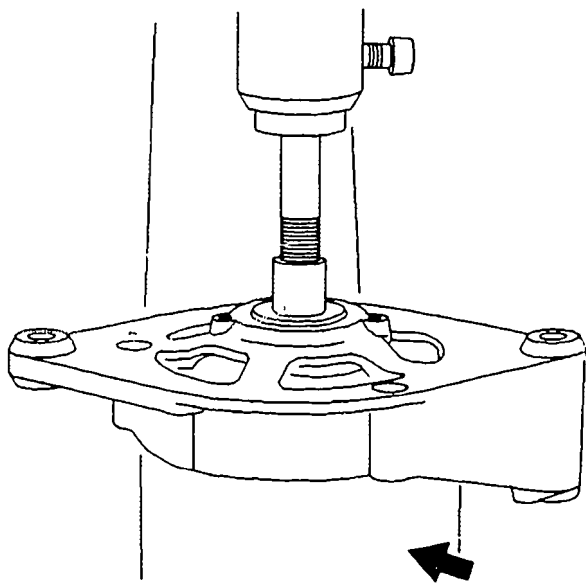
Dismantling claw-pole rotor:

Rotor is only to be removed if collector rings, excitation winding or deep-groove ball bearing/collector-ring end shield defective. Position drive-end bearing on pressing-out ring (arrow) if retaining plate of deep-groove ball bearing is bolted from inside of alternator. Use mandrel press and suitable mandrel to press out claw-pole rotor.

Pressing-out ring: to be improvised

Continue: II16/1 Fig.: II15/2

KME00127



DISMANTLING AND CHECKING ALTERNATOR

Dismantling claw-pole rotor:

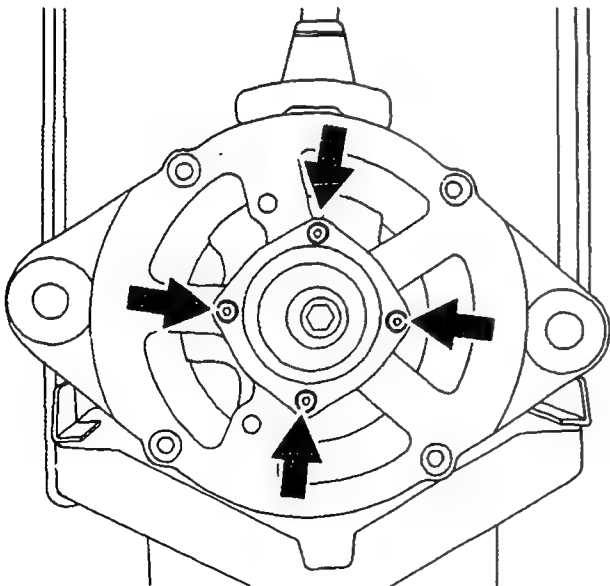
Clamp rotor in clamping support if retaining plate of deep-groove ball bearing is externally bolted. Remove bolts.

Pull deep-groove ball bearing with rotor out of bearing end shield (slide fit).

Continue: II17/1

Fig.: II16/2

KME00405



DISMANTLING AND CHECKING ALTERNATOR

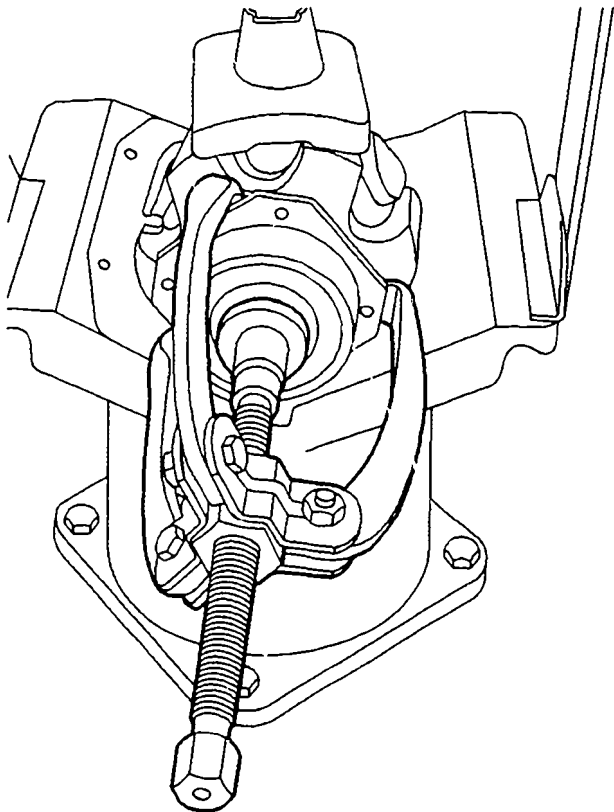
Dismantling claw-pole rotor:

Use commercially available puller to pull off deep-groove ball bearing with cover plate.

Continue: I27/2

Fig.: II17/2

KME00486



DISMANTLING AND CHECKING ALTERNATOR

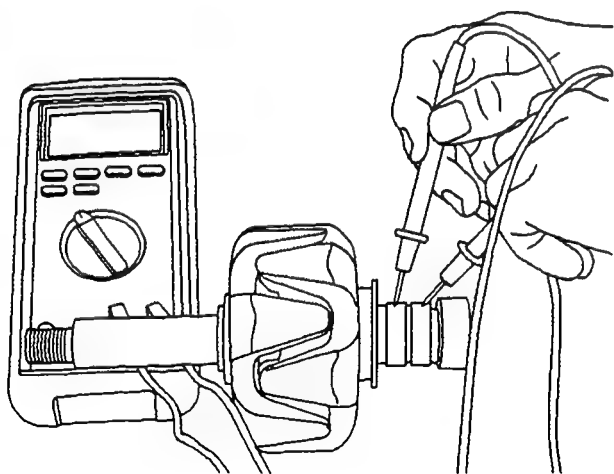
Checking rotor (resistance):

Use alternator tester or universal measuring instrument MMD 302 to measure rotor resistance. Rotor resistances can be seen from TEST SPECIFICATIONS AND SETTINGS section.

| | |
|---|---------------|
| Alternator tester: | 0 684 201 200 |
| Universal measuring instrument MMD 302: | 0 684 500 302 |

Continue: II19/1 Fig.: II18/2

KME00407



DISMANTLING AND CHECKING ALTERNATOR

Checking rotor:
(short to ground)

Use interturn short-circuit tester and test prods to check rotor for short to ground

Test voltage: 80 V AC

Interturn short-circuit tester:

0 986 619 110

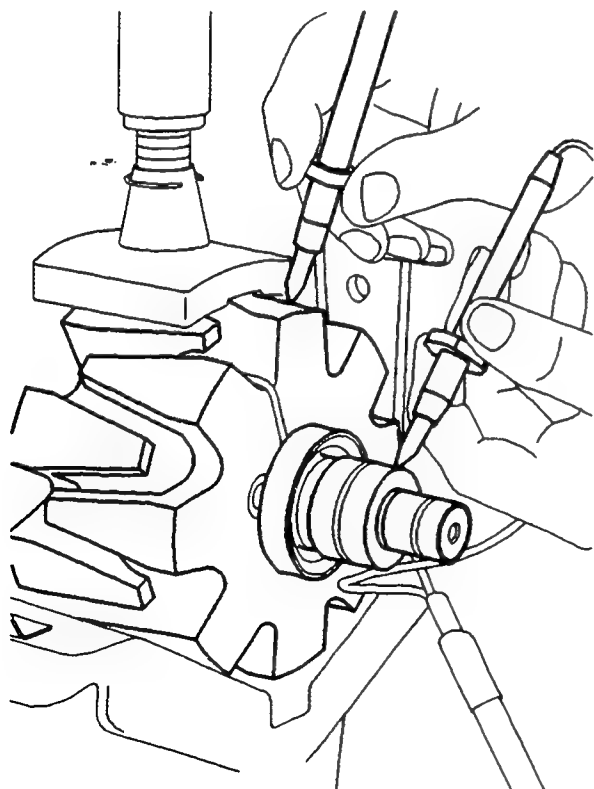
Test prods:

0 986 619 101

Continue: I27/2

Fig.: II19/2

KME00361



DISMANTLING AND CHECKING ALTERNATOR

Measuring concentricity:

Clamp rotor in V-blocks and align so as to be exactly horizontal. Perform concentricity measurement at OD of rotor (arrow) and OD of collector rings using magnetic measurement stand and dial indicator.

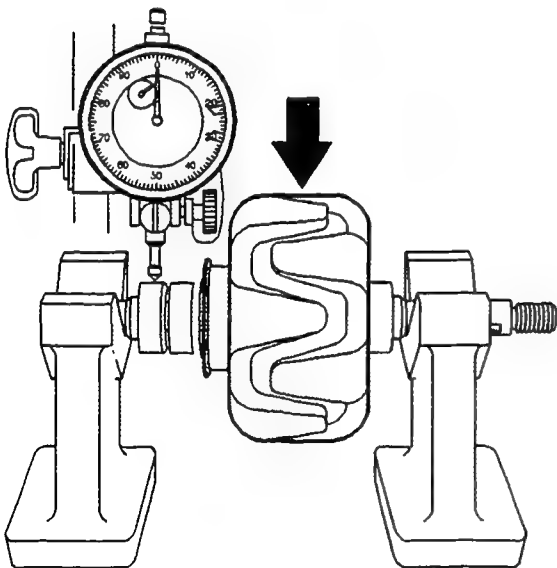
Dial indicator: 1 687 233 011

Magnetic measurement stand: 4 851 601 124

Continue: II21/1

Fig.: II20/2

KME00111



DISMANTLING AND CHECKING ALTERNATOR

Concentricity measurement:

Max. deviation at rotor: 0,05 mm

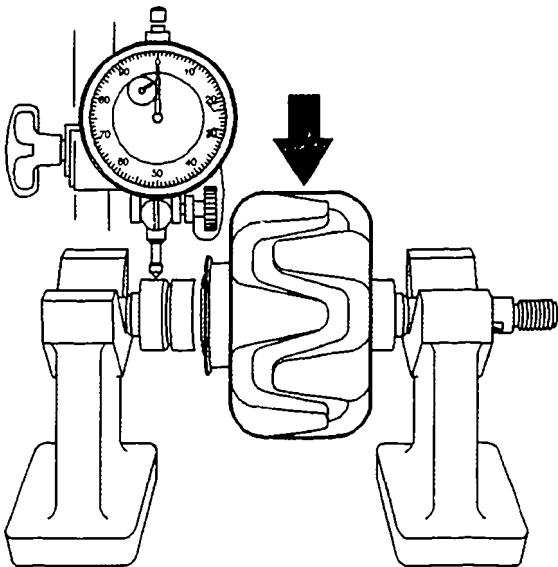
Max. deviation at collector rings: 0,03 mm

Turn down collector rings in the event of greater deviation.

Min. collector ring diameters are listed in TEST SPECIFICATIONS AND SETTINGS section.

Continue: I27/2 Fig.: II21/2

KME00111



DISMANTLING AND CHECKING ALTERNATOR

Pulling off collector rings:

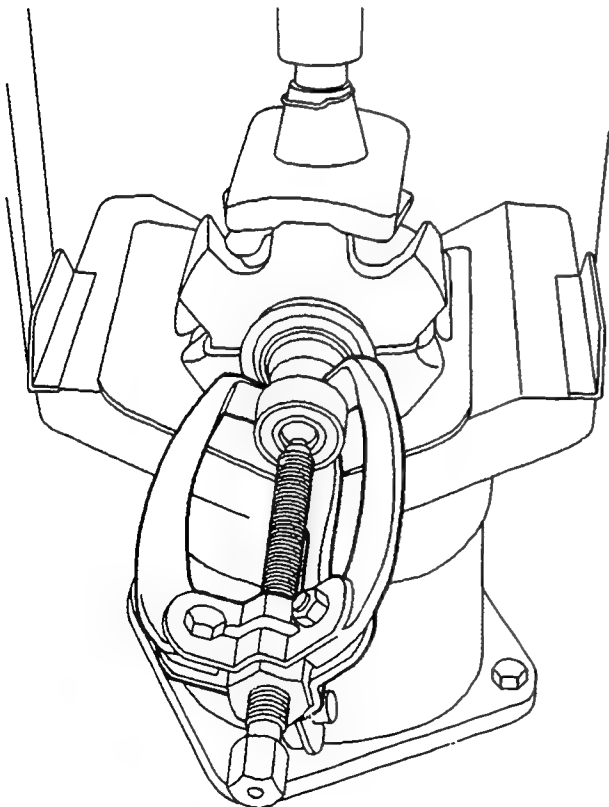
Use commercially available puller to pull off deep-groove ball bearing.

Unsolder wires of excitation winding from collector rings.

Use commercially available puller to pull collector rings off rotor shaft.

Continue: I27/2 Fig.: I122/2

KME00409



COMPONENT CLEANING

A T T E N T I O N : F I R E R I S K

For interference suppression, alternators are fitted with capacitors with a long storage time.

When washing out components, capacitor discharge may occur on immersing components in cleaning fluids, thus possibly causing inflammable liquids to catch fire.

Continue: II23/2

COMPONENT CLEANING

For this reason, components with capacitors are only to be washed out in HAKU 1025/6.

Continue: I01/1

ALTERNATOR ASSEMBLY TABLE

| | |
|---|---------|
| Pressing on collector rings | II25/1 |
| Assembling drive-end bearing | II26/1 |
| Pressing rotor into drive-end bearing | II28/1 |
| Assembling collector-ring end shield (with O-ring) | III01/1 |
| Assembling collector-ring end shield (with plastic bushing) | III02/1 |

Continue: II24/2

ALTERNATOR ASSEMBLY TABLE

| | |
|-----------------------------|---------|
| Installing rectifier | III03/1 |
| Installing stator and rotor | III06/1 |
| Assembling fan and pulley | III09/1 |
| Installing regulator | III11/1 |
| Attaching capacitor | III12/1 |

Continue: I01/1

ASSEMBLING ALTERNATOR

Pressing on collector rings:

Place rotor on mandrel press. Slide collector rings onto rotor shaft and press home using pressing-in tool.

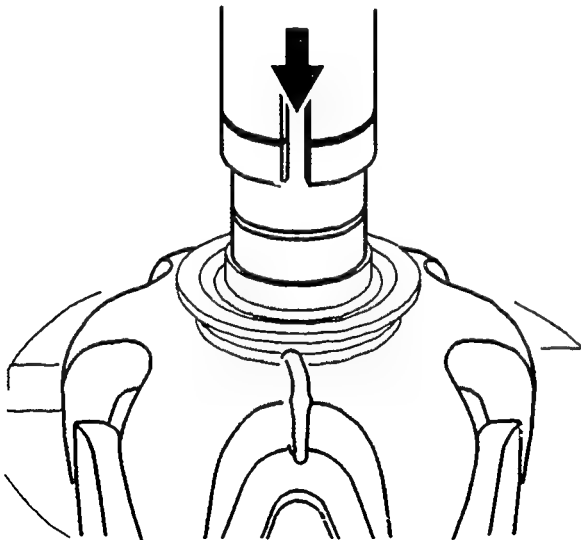
Solder on wire end of excitation winding. Dress soldered joint at both collector rings such that both collector rings are smooth.

Pressing-on mandrel: 0 986 618 101

Continue: II24/1

Fig.: II25/2

KME00113



ASSEMBLING ALTERNATOR

Assembling drive-end bearing:
(retaining plate bolted from inside)

Insert new deep-groove ball bearing
in drive-end bearing.

Fit new retaining plate and secure,
making sure that hole in retaining
plate is aligned with hole in deep-
groove ball bearing.

Tightening torque: 2,4...2,9 Nm

Continue: II27/1

ASSEMBLING ALTERNATOR

Assembling drive-end bearing:
(externally bolted retaining plate)

Insert new deep-groove ball bearing
in drive-end bearing.

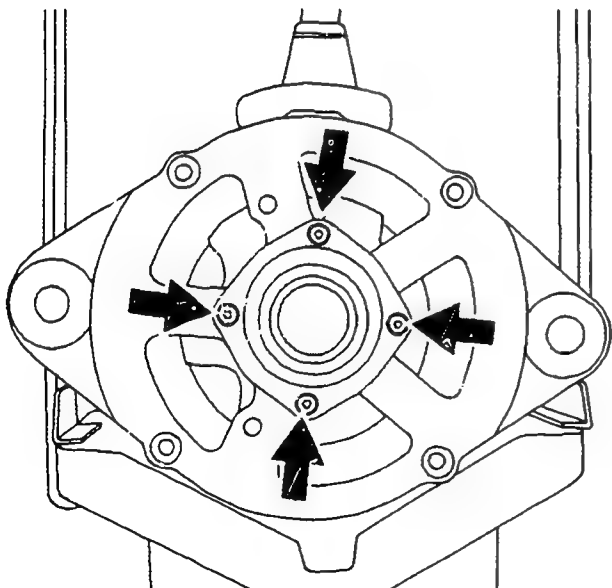
Fit new retaining plate and tighten
bolts alternately.

Tightening torque: 2,4...2,9 Nm

Continue: II24/1

Fig.: II27/2

KME00411



ASSEMBLING ALTERNATOR

Pressing rotor into drive-end bearing:

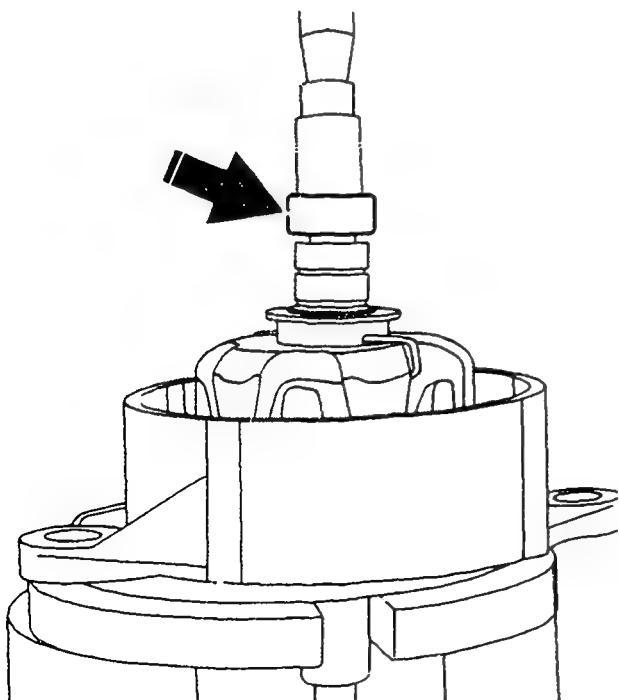
Insert new spacer ring in drive-end bearing on fan end with narrow collar facing deep-groove ball bearing. Position drive-end bearing with spacer ring on a suitable surface such that no pressure is exerted on bearing-end shield when pressing in rotor. Position (arrow) deep-groove ball bearing on rotor shaft on collector-ring end. Use pressing-in mandrel to press home deep-groove ball bearing and rotor in drive-end bearing.

Pressing-in mandrel: 0 986 618 100

Continue: II24/1

Fig.: II28/2

KME00412



ASSEMBLING ALTERNATOR

Assembling collector-ring end shield
(with O-ring):

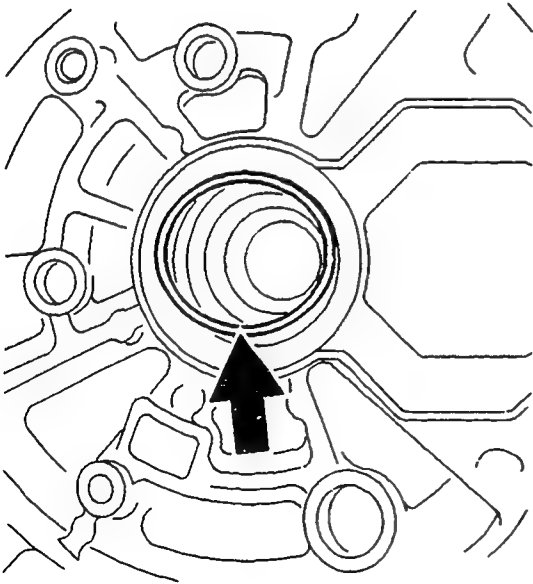
Examine O-ring in collector-ring end shield
shield for damage.

Replace with new O-ring if necessary.

Continue: II24/1

Fig.: III01/2

KME00116



ASSEMBLING ALTERNATOR

Assembling collector-ring end shield
(with plastic bushing):

Examine plastic bushing in collector-ring end shield for damage.
Replace with a new one if necessary.
Insert plastic race in bearing seat such that side lug is positioned in bearing seat groove. Ease of insertion of ball bearing by hand is ensured if ball-bearing seat in plastic race is provided with a thin coat of grease.

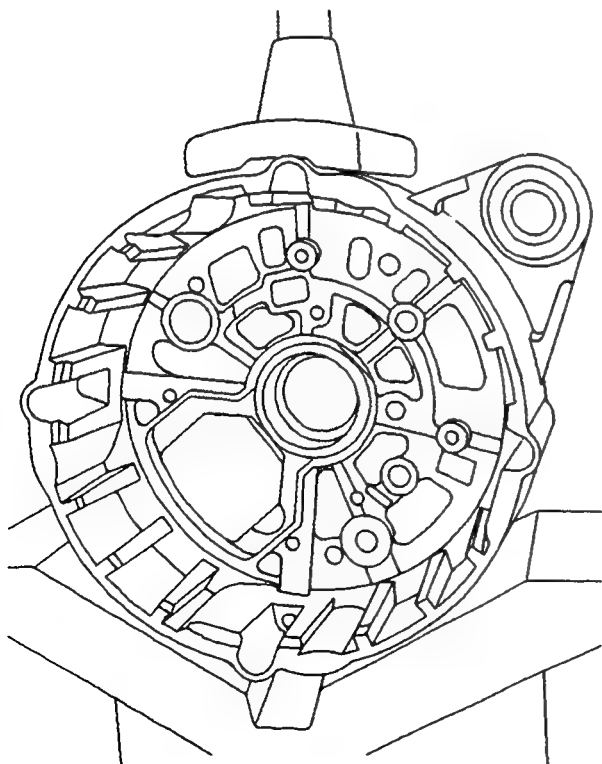
Grease Ft1v34:

5 700 009 000

Continue: II24/1

Fig.: III02/2

KME00414



ASSEMBLING ALTERNATOR

Installing rectifier:

Place seal (arrow) over rectifier key hole and bond on all round with dispersion adhesive.

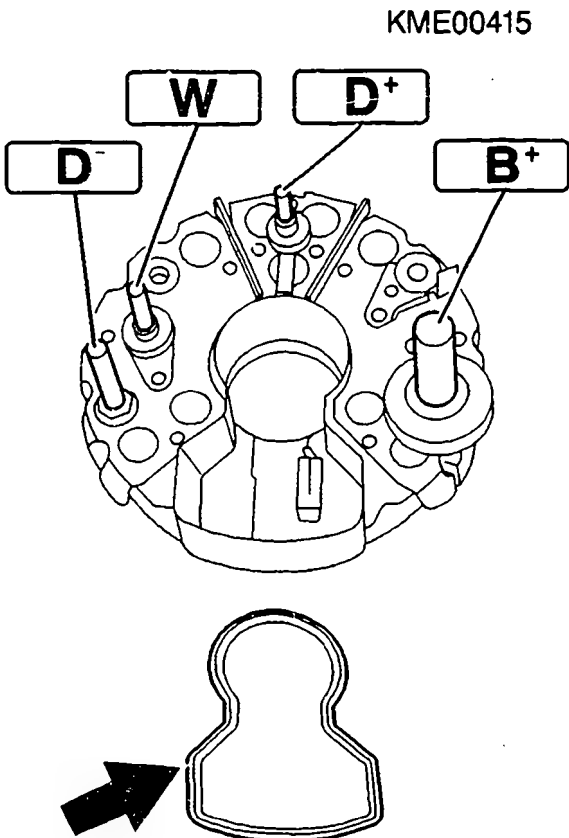
Place shim and insulating bushing over B+ and D+ terminal.

Insert rectifier in collector-ring end shield.

Dispersion adhesive: 5 703 151 000

Continue: III04/1

Fig.: III03/2



ASSEMBLING ALTERNATOR

Installing rectifier:

Attach insulating parts (b, c and d) to studs B+, W and D+. Also attach insulating part (b) to B- in the case of alternator with both poles insulated.

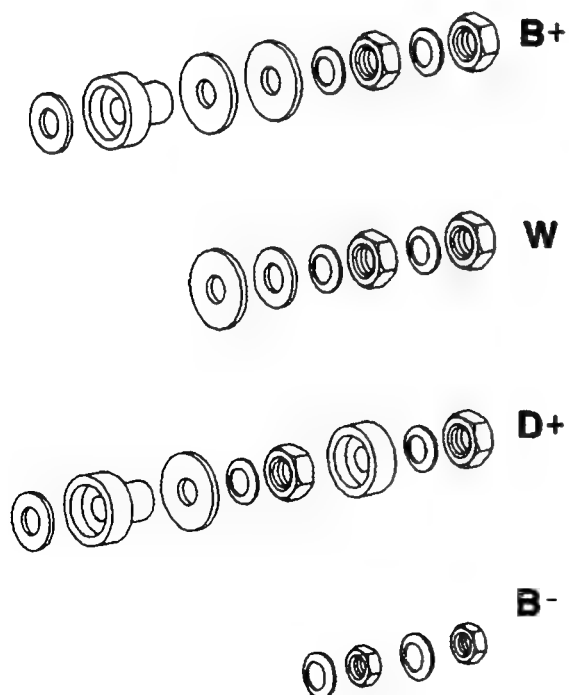
Tightening torques:

| | | |
|----|-------------|-----------------------------|
| B+ | = Both nuts | 7,5...8,0 Nm |
| B- | = Both nuts | 4,8...6,8 Nm (if fitted) |
| D+ | = Both nuts | 1,4...2,0 Nm |
| W | = Nut | 2,7...3,8 Nm (if fitted) |

* Alternators with 6 mm bolt have a lower torque of 3.6...4.8 Nm.

Continue: III05/1 Fig.: III04/2

KME00416



ASSEMBLING ALTERNATOR

Installing rectifier:

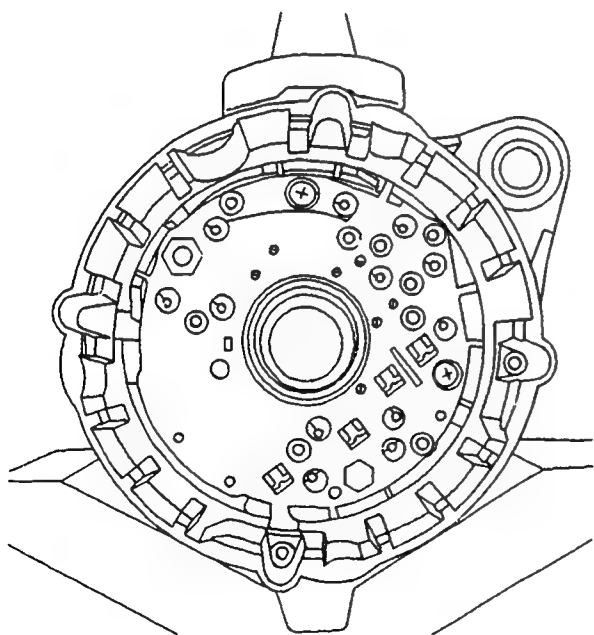
Screw on rectifier on alternator end.

Tightening torque: 1,4...2,0 Nm

Continue: II24/2

Fig.: III05/2

KME00404



ASSEMBLING ALTERNATOR

Installing stator and rotor:

Position stator at collector-ring end shield. Align marks on collector-ring end shield and stator made prior to alternator disassembly. Solder on stator connecting wires. Wires must then not catch on rotor.

N O T E:

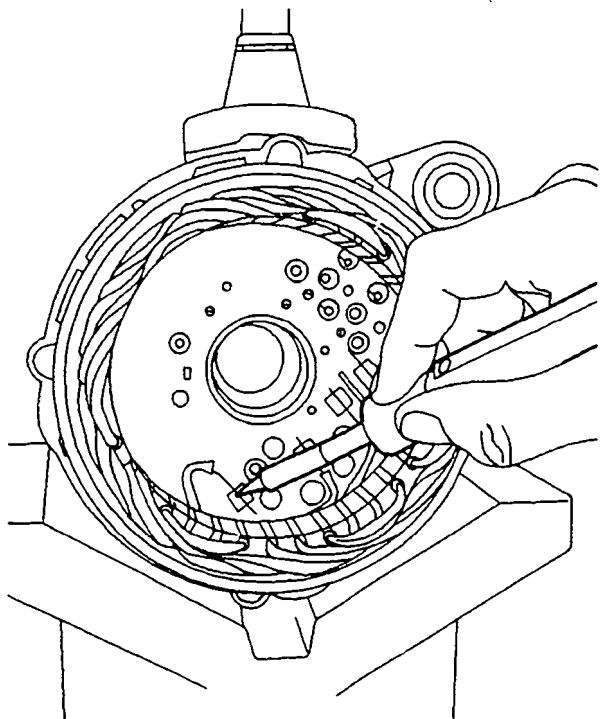
Take care not to use too much tin solder to avoid creating shorting links.

Cover soldered and welded joints with silicone.

Continue: III07/1

Fig.: III06/2

KME00402



ASSEMBLING ALTERNATOR

Installing stator and rotor:

**Carefully insert rotor with drive-
end bearing.**

Continue: III08/1

ASSEMBLING ALTERNATOR

Assembling drive-end bearing:

The following operations must be performed to ensure proper concentricity of the rotor and alignment of the drive-end bearing:

Insert three feeler gauges at intervals of 120 between stator and rotor.
Fit housing bolts and then tighten alternately.

Tightening torque: 4,1...5,5 Nm

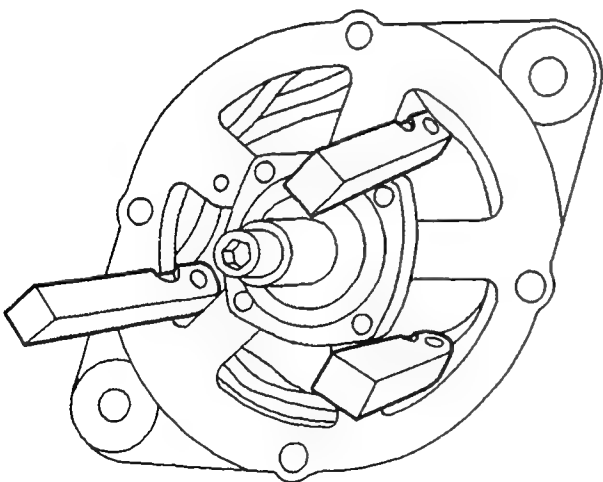
Leaf thickness: 0.2 mm

Feeler gauges: 0 986 618 378

Continue: II24/2

Fig.: III08/2

KME00418



ASSEMBLING ALTERNATOR

Assembling fan and pulley:

On older alternators, insert Woodruff key in groove. Slip NEW fan and supporting plate onto shaft in correct manner. Make sure 5 mm wide and 0.3 mm high embossment at edge of supporting plate is facing fan. Attach belt pulley components to shaft in correct sequence. Fasten entire assembly in position using appropriate box wrench and clamping fixture. Alternators with collar nut have a higher torque of 65...75 Nm.

Tightening torque:

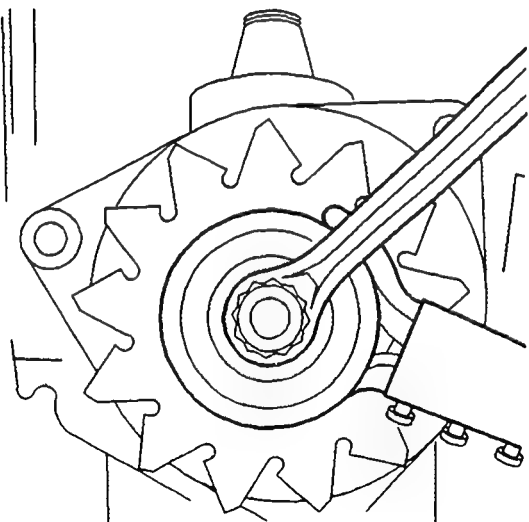
35...45 Nm

Clamping fixture:

0 986 618 107

Continue: III10/1 Fig.: III09/2

KME00141



ASSEMBLING ALTERNATOR

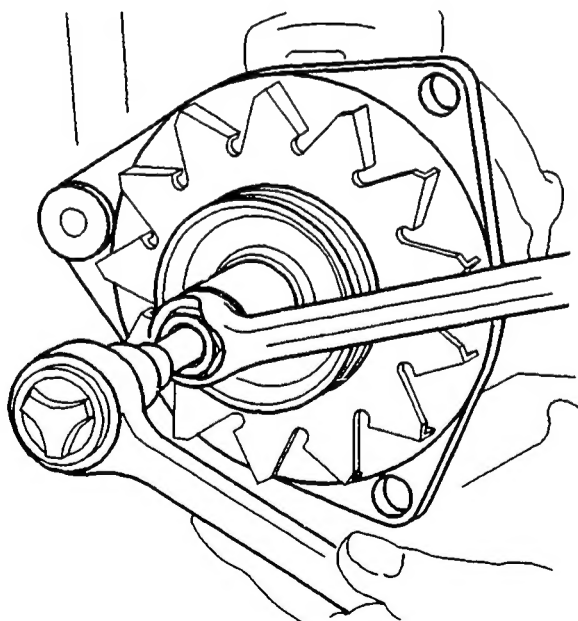
Assembling fan and pulley:

Insert Woodruff key in groove. Slip NEW fan and supporting plate onto shaft in correct manner. Make sure 5 mm wide and 0.3 mm high embossment at edge of supporting plate is facing fan. Attach belt pulley components to shaft in correct sequence. Fasten entire assembly in position using Allen key and suitable box wrench. Alternators with collar nut have a higher torque of 65...75 Nm.

Tightening torque: 45...55 Nm

Continue: II24/2 Fig.: III10/2

KME00142



ASSEMBLING ALTERNATOR

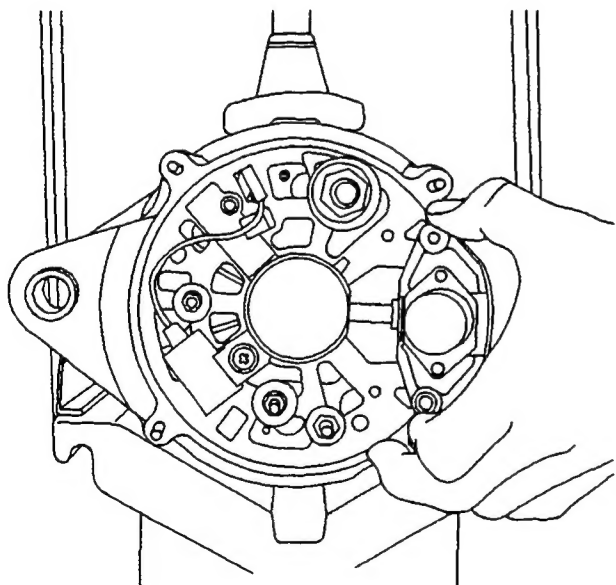
Installing regulator:

Swivel regulator carefully into collector ring end shield and pull out pin. Position regulator over tapped holes and screw on.

Tightening torque: 1,6...2,3 Nm

Continue: II24/2 Fig.: III11/2

KME00421



ASSEMBLING ALTERNATOR

Attaching capacitor:

Screw on interference-suppression capacitor.

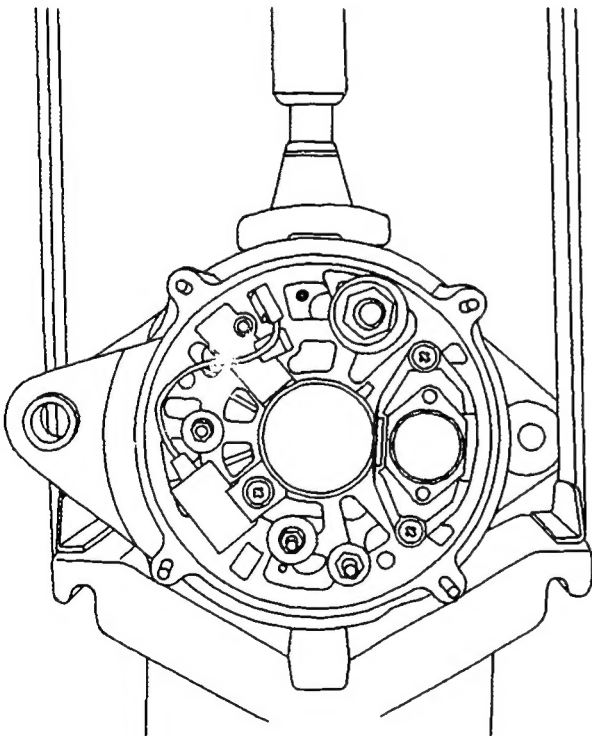
Attach plug of interference-suppression capacitor to B+ plug connection.

Tightening torque: 2,9...4,1 Nm

Continue: II24/2

Fig.: III12/2

KME00489



EDITORIAL NOTE

Copyright 1998 ROBERT BOSCH GmbH
Automotive-Equipment After-Sales
Service
Technical Publications Department
KH/VDT,
Postfach 30 02 20, D-70422 Stuttgart

Published by:
After-Sales Service Department for
Training and
Technology (KH/VSK).
Time of going to press 06.1998.
Please direct questions and comments
concerning the contents to our
authorized representative in your
country.

Continue: III13/2

EDITORIAL NOTE

The contents of this microcard are
intended only for the Bosch Franchised
After-Sales Organization. Passing on
to third parties is not permitted.

Microfilmed in the Federal Republic of
Germany.

Continue: I01/1